Food and Agriculture Organization of the United Nations

GLOBAL SYMPOSIUM on SOILS and WATER

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Soil and water: a source of life

Management of Irrigation on Irrigation and Drainage Systems

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1.0 INTRODUCTION – IRRIGATION & DRAINAGE (I & D) MANAGEMENT

1.1 IMPORTANCE OF IRRIGATION

- Adoption of Irrigation development as a policy option positively impacts rural livelihoods (Mhembwe et al., 2019; Gebrehiwot, et al., 2015).

Benefits/aims include:

- To promote agricultural production/productivity
- Mitigate impacts of unpredictable rainfall (Muzerengi & Mapuranga 2017)

INTRO – I & D MANAGEMENT CONT'D

- Consequently, Irrigation schemes enable economic transactions, and the improvement of livelihoods, wealth creation & and infrastructure development (Christine et al. 2008).
- Furthermore, promotes food security and improves the standard of living of the rural people (Hussain & Hanjra 2014)

But what are the most efficient and affordable irrigation technologies that can help small-scale farmers optimize water usage while maintaining soil health in irrigated agriculture?

Innovative Irrigation Technologies for Optimal Water Use

- Crop irrigation is the largest user of water accounting for about 70% of global freshwater withdrawals.
- As such, there has been mounting pressure to limit water supply to irrigated agriculture and to produce more food with less water.
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Innovative Irrigation Technologies for Optimal Water Use cont'd

- For instance, the Commission on Irrigation and Drainage (ICID) Water Savings (WatSave) program initiated in 1993 (Kulkarni & Kulkarni 2011).
- A vast range of technologies is available for improved operation, management and efficient water use

Innovative Irrigation Technologies for Optimal Water Use cont'd

- Water-saving approaches/ practices may be categorized as :
  - engineering,
  - agronomical,
  - management and
  - Institutional

success depends on the level of integration and socio-economic dimensions at the local level

Some examples of these technologies include:

Innovative Irrigation Technologies for Optimal Water Use cont'd

i. System Modernization: e.g. The Water Administration System (WAS) an innovative decision support program developed in South Africa

Used by Water User Associations on Irrigation schemes facilitates efficient water use at the farm level and increases water productivity

losses were reduced by up to 20%
average losses of 15% (8,147 m3)
41 million m^3 annual water savings

Innovative Irrigation Technologies for Optimal Water Use cont'd

ii. Water Saving Rice Irrigation

The three main types of Water efficient irrigation (WEI) practiced in China:

(i) combining shallow water layer with wetting and drying (SWD)

(ii) alternate wetting and drying (AWD)

(iii) semi-dry cultivation (SDC)

Innovative Irrigation Technologies for Optimal Water Use cont'd

farmers irrigate their fields only after a certain number of days when the ponded water disappears

Under optimal mgt, the amount of water required reduces by 25% without a reduction in yields.

Innovative Irrigation Technologies for Optimal Water Use cont'd

- irrigation water use reduced by 3-18%, 7-25% and 20-50% under SWD, AWD and SDC, respectively.

decrease in the percolation and seepage losses and also in the evapo-transpiration & utilization of rainfall

(AWD) irrigation for rice has become popular in Philippines, Bangladesh and Vietnam.

Innovative Irrigation Technologies for Optimal Water Use cont'd

iii. Improved Irrigation methods

iv. On-Farm Irrigation Scheduling

v. Controlled Drainage:

vi. Use of Poor Quality Waters

Benefits of Sustainable Soil & Water Mgt Practices

Broadly, the benefits of sustainable Soil & Water Mgt practices can include:

i. Increased productivity and yields
ii. Up to 70% decrease in fuel energy or manual labour
iii. Up to 50% less fertilizer use;
iv. 20% or more reduction in pesticide and herbicide use
v. 30% less water requirement;
vi. Reduced cost outlay on farm machinery

Benefits of Sustainable Soil & Water Mgt Practices Continued

vii. Enhanced climate change adaptability of cropping systems, farms and landscapes

viii. Greater carbon sequestration and lower emissions of GHGs

ix. Reduced soil erosion

x. Decreased flood risks

xi. Improved water quality and quantities, and

xii. Reduce infrastructure maintenance costs and

xiii. Water treatment costs (Friedrich et al., 2009; Kassam et al., 2009; Kassam et al., 2014).

INNOVATIVE SOIL FERTILITY & NUTRIENT MGT FOR IRRIGATED AGRICULTURE

- Other than conventional nutrient practices, several innovative options exist under the ISFM approach
- IFSM is more than routine addition of mineral & organic fertilizer to the soil
- It requires a year-round suite of activities for the optimisation of nutrient acquisition, delivery & recycling
- Involves systematic collection & processing of available organic materials on the farm & the optimisation of
- Practices are not rigid but based on principles, site conditions, & farm enterprise (*CIAT,* 2009 & Fairhurst, 2012)

INNOVATIVE SOIL FERTILITY & NUTRIENT MGT FOR IRRIGATED AGRICULTURE

Some specific practices under ISFM include:

- Agroforestry
- Conservation Agriculture
- ISFM including micro-dosing
- Organic agriculture or organic farming
- Stand-alone soil management techniques

The End of Presentation–
Thank you for your Attention!!!

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